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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,107	03/05/2007	Young-Man Jeong	0630-2627PUS1	5526
2292 7590 12/04/2008 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			EXAMINER CHEN, KEATH T	
			ART UNIT 1792	PAPER NUMBER
			NOTIFICATION DATE 12/04/2008	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/565,107	<b>Applicant(s)</b> JEONG ET AL.	
	<b>Examiner</b> KEATH T. CHEN	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,3-12 and 15-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-12 and 15-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Amendment*

The claim amendment filed on 11/12/2008, addressing rejection of claims 1-22 from the first office action (07/11/2008) by amending claims 11, 14, and 16 and cancelling claim 13 is acknowledged and will be addressed below.

### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

**1. Claims 1, 6, 10-12, and 15-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Hayakawa et al. (US 5580822, hereafter '822), in view of Kutsunai et al. (US 20010028074, hereafter '074), Loan et al. (US 6136725, hereafter '725, and Takada (JP 06-254416, hereafter '416).**

'822 teaches some limitations of:

Claim 1: A plasma surface processing system (Fig. 5) for processing a surface of a metal material by forming plasma (col. 7, lines 66-67) in a reaction (chamber #115, col. 7, line 47) comprising: a supply device (thermostatic chamber #108, col. 7, lines 27-28) configured to supply a plasma processing solution (#101, col. 7, lines 2-3) into the reaction chamber as a liquid drop form (col. 9, lines 55-57, when operated at lower than 40°C), a processing solution reservoir (#102 and #118, col. 7, line 20 and 25) configured to store the plasma processing solution (#101) as a hermetic state (col. 7, lines 21-23, vacuum requires seal); a supply pipe (pipe near MFC #103) connecting the processing solution reservoir (#102 and #118) to the reaction chamber (#115); and a

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temperature control device provided with the processing solution reservoir and configured to control a temperature of the stored plasma processing solution (#108 with heater and temperature sensor, col. 8, lines 13-14), wherein the temperature control device includes: a receiving tank (#108) configured to hold the processing solution reservoir (#102), a heater installed in the receiving tank (as seen in Fig. 5).

Applicant's claim requirement "metal material" is considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (*Walter*, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (*In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02). When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (*In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Claim 16: The system of claim 1, wherein the surface of the metal material is consecutively processed (the apparatus is capable of).

Applicant's claim requirement "consecutively processed " is considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit

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the scope of a claim (*Walter*, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106).

Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (*In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02). When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (*In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Claim 17: The system of claim 1, wherein the metal material is an electrode (when substrate #111 is not present, the vapor deposits on electrode directly).

Claim 18: The system of claim 1, wherein the processing solution is hexamethyldisilazane (HDMS) or hexamethyldisiloxane (HDMSO).

Applicant's claim requirement " hexamethyldisilazane (HDMS) or hexamethyldisiloxane (HDMSO)" is considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (*Walter*, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (*In re Casey*, 152 USPQ 235 (CCPA 1967); *In re Otto*, 136 USPQ 458, 459 (CCPA

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1963); MPEP2111.02). When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (*In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

Claim 20: The system of claim 1, wherein the reservoir (#102 and #118) further comprises a processing solution supplementary device (container #118 col. 7, line 25) for supplementing plasma processing solution thereinto.

'822 does not teach the limitations of:

Claim 1: a carrier gas inflow pipe connected to the processing solution reservoir and configured to introduce a carrier gas, which carries liquid drops of the plasma processing solution, into the processing solution reservoir; (a supply pipe) configured to supply the carrier gas and the liquid drops of the plasma processing solution to the reaction chamber, (a receiving tank configured to hold) insulating oil, and a cooling device installed in the receiving tank

'074 is an analogous art in the field of CVD (abstract; similar to '822, field of the invention), particularly in supplying precursor mist ([0077]; similar to '822 precursor liquid droplet, col. 9, lines 55-57). '074 teaches the use of carrier gas N<sub>2</sub> ([0186], Fig. 10) to carrier liquid drops (mist, [0077]) to supply to the reaction chamber.

'725 is an analogous art in the field of CVD (col. 2, line 37; similar to '822, field of the invention), particularly in solving problem of liquid precursor delivery (col. 1, line 58

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to col. 2 line 4; similar to '822 precursor liquid droplet, col. 9, lines 55-57). '725 teaches a MFC/gas amount controller (Figs. 1A-B, #166, col. 16, lines 59-60) for controlling the amount of carrier gas (#154, He, col. 7, line 64); a separation pipe (the line near valve #157 that goes up and right to the upstream section #78 of the reaction chamber) to the reaction chamber; the supply pipe (from vaporizer #26 to #78) provided with a gas amount controller (#14, col. 6, line 34 to col. 7, line 8); a pair of valves (#42, col. 7, line 49 and #58, col. 7, line 57) up and down the gas amount controller (#14); and heater for the supply pipe (col. 3, lines 20-21).

'416 is an analogous art in the field of vapor generation (English abstract, Purpose; similar to '822 precursor liquid droplet, col. 9, lines 55-57). '416 teaches an oil bath (Fig. 1, #8) and cooling pipe (#6), in addition to heater (#18), for the generation of vapor.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have added the N<sub>2</sub> carrier gas, as taught by '074; to have added the liquid precursor delivery system, as taught by '725; and to have added an oil bath and cooling coil/device, as taught by '416, to the apparatus in Fig. 5 of '822.

The motivation to add carrier gas is suitability. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945). The motivation to add the liquid precursor delivery system is to delivery low

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vapor pressure precursor, as taught by '725, (col. 2, lines 33-41). The motivation to add an oil bath and cooling coil/device is to delivery high vapor content/humidity precursor, as taught by '416, (Constitution).

For substantially the same reason as claim 1 rejection above, claim 22 is rejected.

'725 further teach the limitations of:

Claim 6: The system of claim 1, wherein the carrier gas inflow pipe is provided with a gas amount controller (Figs. 1A-B, #166, col. 16, lines 59-60) for controlling amount of carrier gas (#154, He, col. 7, line 64).

Claim 10: The system of claim 1, wherein the carrier gas inflow pipe is further provided with a separation pipe (the line near valve #157 that goes up and right to the upstream section #78 of the reaction chamber) connected to the reaction chamber in order to introduce the carrier gas into the reaction chamber.

Claim 11: The system of claim 1, wherein the supply pipe (from vaporizer #26 to #78) is further provided with a gas amount controller (#14, col. 6, line 34 to col. 7, line 8) for controlling amount of the carrier gas including liquid drops of the processing solution.

Claim 12: The system of claim 11, wherein a pair of valves valves (#42, col. 7, line 49 and #58, col. 7, line 57) for controlling flow of the carrier gas are installed at the supply pipe up and down on the basis of the gas amount controller.



Claim 15: The system of claim 1, wherein the supply pipe is further provided with a heater (col. 3, lines 20-21) for increasing temperature of the carrier gas including liquid drops of the processing solution.

'074 teaches the other limitations of:

Claim 19: The system of claim 1, wherein the carrier gas is N<sub>2</sub> ([0186], Fig. 10) or He.

'822 further teaches some limitations of:

Claim 21: The system of claim 20, wherein the processing solution supplementary device (#118) comprises: a first supplementary pipe (pipe between #117 and #102) connected to the reservoir (#102); a storage container (#118 is a container) in which processing solution (#101) is stored; a second supplementary pipe (pipe between #118 and #117) connected to the storage container (#118); a connecting unit (pipe line intrinsically having many connecting units, for example, the connection between pipe and valve) for connecting the first supplementary pipe and the second supplementary pipe; and a valve (#117).

'822, '074, '725, and '416, together, do not teach the limitations of:

Claim 21: valves respectively installed at the first and second supplementary pipes.

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For claim 21, '822 and '074 disclose the claimed invention except for multiple valves. It would have been an obvious matter to duplicate multiple valves for maintenance, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

**2. Claims 3-5 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over '822, '074, '725, and '416, further in view of Okutani (US 5135608, hereafter '608).**

'822, '074, '725, and '416, together, teach all limitations of claim 1, as discussed above. '074 further teaches some limitations of:

Claim 3: The system of claim 2, wherein the carrier gas inflow pipe is installed under a state of being soaked in the processing solution stored in the reservoir (as shown in Fig. 10).

'822, '074, '725, and '416, together, do not teach the limitations of:

Claim 3: (Gas inflow pipe) has a plurality of discharge holes for forming processing solution foam by the carrier gas discharged from the inflow pipe.

Claim 4: The system of claim 3, wherein an end portion of the carrier gas inflow pipe has a ring shape where the plurality of discharge holes are formed.

'608 is an analogous art in the field of CVD (col. 1, line 38; similar to '822, field of the invention), particularly in supplying precursor (col. 12, line 44; similar to '822

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precursor liquid droplet, col. 9, lines 55-57). '608 teaches the use of gas inflow pipe (Fig. 33, #678) with a plurality of discharge holes (as shown in Fig. 33).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have added a plurality of discharge holes, as taught by '608, to the N<sub>2</sub> carrier gas inflow pipe to the apparatus in Fig. 10 of '074 (and then combined with '822).

The motivation to add a plurality of discharge holes is to increase bubbling rate and suitability. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).

For claim 3, '822 and '074 discloses the claimed invention except for multiple discharge holes. It would have been an obvious matter of design choice to duplicate discharge holes, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

For claim 4, '822, '074, '725, '416, and '608 disclose the claimed invention except for the ring shaped end portion of the inflow pipe. It would have been an obvious matter of design choice to change the end portion of the inflow pipe to ring shape, since such a

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modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the ordinary level of skill in the art. *In re Dailey*, 357 F.2<sup>nd</sup> 669, 149 USPQ 1966.

'725 further teaches gas flow control valve (#157, col. 8, lines 4-5) at the separation pipe and valve (#160, col. 8, line 6) between a connection spot of the inflow pipe and the separation pipe (intersection point below #157 and to the right of #160) and the reservoir (#200).

Claim 5: The system of claim 3, wherein the carrier gas inflow pipe is provided with a gas amount controller for controlling amount of carrier gas.

Claim 7: The system of claim 3, wherein the carrier gas inflow pipe is further provided with a separation pipe connected to the reaction chamber in order to introduce the carrier gas into the reaction chamber.

Claim 8: The system of claim 7, wherein gas flow control valves are respectively installed at the separation pipe and between a connection spot of the inflow pipe and the separation pipe and the reservoir.

Claim 9: The system of claim 7, wherein the separation pipe is connected to the supply pipe.

For substantially the same reason of *Graham v. Deere* analysis, claims 5 and 7-9 are rejected.

***Response to Arguments***

Applicant's arguments filed on 11/12/2008 have been fully considered, but they are not persuasive.

3. Applicants did not address the amendment in regarding to 35 USC 112 2<sup>nd</sup> paragraph rejection. Nevertheless, Applicants' amendment of claim 1 overcomes 35 USC 112 2<sup>nd</sup> paragraph rejection.

4. In regarding to art rejections of various claims, Applicants' argument is that Hayakawa '822 does not disclose "a supply device configured to supply a plasma processing solution into the reaction chamber as a liquid drop form" by citing Fig. 7, or col. 9, lines 49-58), see the first paragraph of page 10.

This argument is found not persuasive.

a) Rectifier #2003 (see Fig. 6) is inside the reaction chamber (#2006). Whether the DMAH is completely vaporized or not is immaterial to the fact that liquid drop form is already supplied to the reaction chamber (#2006).

b) DHAM is evaporated substantially 100% between 40 and 100 C (col. 9, lines 51-55). Substantially means there are a small amount of liquid droplet not evaporated. Furthermore, it is well-known the transition from complete liquid droplet to complete vapor phase is transition slowly in a temperature range. There is no such magic temperature setting that it is all liquid droplet below it and all vapor state above it, (a step function exist in mathematical concept but not in physical world).

c) '822 clearly teaches that liquid droplet is delivered to the rectifier (col. 16, lines 26-34).

***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEATH T. CHEN whose telephone number is (571)270-1870. The examiner can normally be reached on 6:30-3.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/K. T. C./

Examiner, Art Unit 1792

/Ram N Kackar/

Primary Examiner, Art Unit 1792